CLAIMS

Claims 1 – 23 (previously canceled).

Claim 24 (currently amended): An apparatus for converting H_2S in a natural gas stream to elemental sulfur and hydrogen in a single operation, the apparatus comprising:

a device for removing contaminants from the natural gas stream; and

conversion means for receiving the natural gas stream ~~H_2S~~ and for converting H_2S in the natural gas stream to elemental sulfur and hydrogen at a predetermined temperature ~~less than approximately four hundred (400°) degrees C~~.

Claim 25 (previously added): The apparatus of claim 24 wherein the conversion means is a nonthermal plasma corona reactor.

Claim 26 (currently amended): The apparatus of claim 24 ~~1~~ and further comprising:

adsorbent means positioned within a fluidized bed for removing at least a portion of H_2S from a natural gas stream; and

means for providing the removed H_2S to the conversion means.

Claim 27 (previously added): The apparatus of claim 26 wherein the adsorbent means includes a first adsorbent having a first predetermined temperature and second adsorbent having a second predetermined temperature.

Claim 28 (previously added): The apparatus of claim 27 wherein the first adsorbent and the second adsorbent are a molecular sieves.

Claim 29 (previously added): The apparatus of claim 28 wherein the second predetermined temperature is greater than the first predetermined temperature.

Claim 30 (currently amended): A method for converting H_2S in a natural gas stream to elemental sulfur and hydrogen, the method comprising:

providing a nonthermal plasma corona reactor;

introducing the natural gas stream ~~H_2S~~ into the nonthermal plasma corona reactor; and

removing contaminants from the natural gas stream and converting the H_2S in the natural gas stream to elemental sulfur and hydrogen at a predetermined temperature in a single operation.

Claim 31 (previously added): The method of claim 30 wherein the predetermined temperature is less than approximately four hundred (400^{o}) degrees C.

Claim 32 (new): An integrated process, the process comprising:

removing hydrogen sulfide in a gaseous stream; and

recovery of hydrogen and sulfur from the hydrogen sulfide by nonthermal plasma processing in a single operation.

Claim 33 (new): The process of claim 32 wherein the hydrogen sulfide containing gas stream flows through a tubular pulsed corona nonthermal plasma reactor having sulfur-resistant inner walls supported on a stainless steel substrate, and further having a sulfur resistant wire electrode.

Claim 34 (new): The process of claim 33 wherein the sulfur-resistant metal layer and wire electrode is an alloy selected from the group consisting of platinum and copper.

Claim 35 (new): The process of claim 34 wherein the sulfur-resistant metal layer consists of an alloy of platinum and copper having the composition 95% Pt and 5% Cu.

Claim 36 (new): The process of claim 34 wherein the sulfur-resistant wire electrode is made from an alloy of platinum and copper having the composition 95% Pt and 5% Cu.

Claim 37 (new): An integrated process for removal of hydrogen sulfide in a gaseous stream and the subsequent recovery of hydrogen and sulfur by nonthermal plasma processing, the process comprising:

contacting the hydrogen sulfide laden gaseous stream with a solid adsorbent in a fluidized bed in the presence of an attrition-resistant solid lubricant and a means for recovery of the adsorbed hydrogen sulfide; and

flowing the recovered hydrogen sulfide through a wire-in-tube pulsed corona nonthermal plasma reactor having sulfur-resistant inner walls supported on a stainless steel substrate wherein the protective metal layer and the wire electrode are made of an alloy selected from the group consisting of platinum and copper wherein the preferred alloy consists of 95% Pt and 5% Cu.